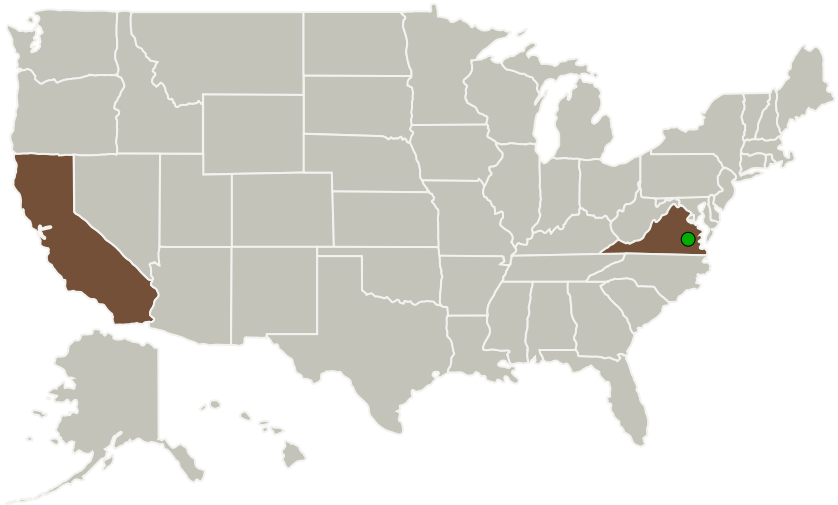
Next Generation Extremely Large Solar Array System for NASA Exploration Missions, Phase I

Completed Technology Project (2013 - 2013)

Project Introduction

The proposed technology is a revolutionary solar array advancement that relies on a structurally optimized platform to provide unparalleled specific-performance and affordability for extremely large area solar arrays. The proposed technology is comprised of a central beam tensioned membrane architecture that leverages key heritage technology elements to provide low-risk and high end-user acceptance. The proposed technology will enable emerging Solar Electric Propulsion Space Science and Exploration missions through ultra-affordability, ultra-lightweight, ultra-compact stowage volume, design simplicity, robustness and high damage tolerance, broad scalability, high strength/stiffness, high voltage and high/low temperature operation capability within many environments. Once completely optimized through the proposed SBIR program the proposed technology promises to provide NASA/industry a near-term and low-risk solar array system that provides revolutionary performance in terms of high specific power (>300 up to 500 W/kg BOL at the wing level, PV-blanket dependent), affordability (up to 40% cost savings at the array level, PV-blanket dependent), ultra-lightweight, high deployed stiffness (10X better than current arrays), high deployed strength (10X better than current arrays), compact stowage volume (>70-80 kW/m3 BOL, 10X times better than current arrays), high reliability, high radiation tolerance, high voltage operation capability (>200 VDC), scalability (500W to 100's of kW), and LILT/HIHT operation.

Primary U.S. Work Locations and Key Partners



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Organizational Responsibility

Responsible Mission Directorate:

Space Technology Mission Directorate (STMD)

Lead Organization:

Deployable Space Systems, Inc (DSS)

Responsible Program:

Small Business Innovation Research/Small Business Tech Transfer

Project Management

Program Director:

Jason L Kessler

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Organizations Performing Work	Role	Type	Location
Deployable Space Systems, Inc(DSS)	Lead Organization	Industry	Goleta, California
Langley Research Center(LaRC)	Supporting Organization	NASA Center	Hampton, Virginia

Primary U.S. Work Locations	
California	Virginia

Project Transitions

May 2013: Project Start

November 2013: Closed out

Closeout Documentation:

- Final Summary Chart*(https://techport.nasa.gov/file/138355)*

Images

Project Image

Next Generation Extremely Large Solar Array System for NASA Exploration Missions *(https://techport.nasa.gov/image/126004)*

Project Management *(cont.)*

Program Manager:

Carlos Torrez

Principal Investigator:

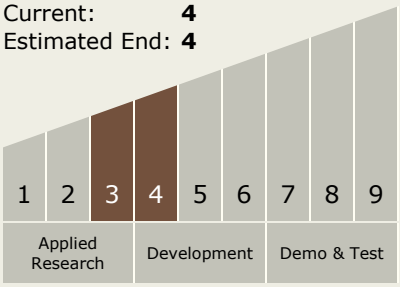
Brian R Spence

Co-Investigator:

Brian Spence

Technology Maturity (TRL)

Start: **3**
Current: **4**
Estimated End: **4**



Technology Areas

Primary:

- TX12 Materials, Structures, Mechanical Systems, and Manufacturing
  - TX12.2 Structures
    - TX12.2.1 Lightweight Concepts

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Target Destinations

The Sun, Earth, The Moon, Mars, Others Inside the Solar System, Outside the Solar System